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## STRATEGY RESEARCH PROJECT

# REDRESSING NATIONAL GUARD PERSONNEL SHORTAGES: UNMANNED AERIAL VEHICLES

BY

LIEUTENANT COLONEL RUTH A. GILBERT United States Air Force

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#### **ABSTRACT**

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TITLE:

REDRESSING NATIONAL GUARD PERSONNEL SHORTAGES: UNMANNED

**AERIAL VEHICLES** 

FORMAT:

Strategy Research Project

DATE:

09 April 2002

PAGES: 38

CLASSIFICATION: Unclassified

The National Guard's mission is continually transforming and must do so to stay viable and meet the Nation's needs. The National Guard's mission of Homeland Security may include the war on drugs, defense against terrorism on high-value targets, and border security for our national, territorial, and state borders. In view of the tragedy on 11 September 2001, the National Guard's mission, under the auspices of homeland security, is continually expanding without significant additions in manpower or operating funds. Doing more with stable or decreasing resources requires innovative thinking to effectively perform these expanded missions. The use of unmanned aerial vehicles (UAV) and drones could provide state-of-the-art technology to offset the manpower drain. Further, because it has a stable workforce to provide research data, the Air National Guard is an ideal organization for testing unmanned aerial vehicles and drone surveillance technology.

### **TABLE OF CONTENTS**

ABSTRACT	li
LIST OF ILLUSTRATIONS	vi
UNMANNED AERIAL VEHICLES TECHNOLOGIES AND POTENTIAL NATIONAL GUAR	D MISSIONS1
PURPOSE	1
THE NATIONAL GUARD	2
AIR NATIONAL GUARD	4
ARMY NATIONAL GUARD	5
NATIONAL GUARD RESOURCES	6
NATIONAL GUARD MISSION EXPANSION	8
NATIONAL GUARD RESOURCE ENHANCEMENTS	10
TRANSFORMATION SUPPORT FROM TOP LEADERSHIP	10
ACQUISITION NEEDS AND PROCESS	11
UNMANNED AERIAL VEHICLES	12
UNMANNED AERIAL VEHICLE CAPABILITIES	18
UAV CURRENT USES IN THE NATIONAL GUARD	18
NEW UAV ROLES IN THE NATIONAL GUARD	19
CONCLUSION	20
ENDNOTES	23
BIBLIOGRAPHY	27

### LIST OF ILLUSTRATIONS

FIGURE 1 PREDATOR	13
FIGURE 2 SHADOW TACTICAL UNMANNED AERIAL VEHICLE	14
FIGURE 3 HUNTER UAV	15
FIGURE 4 U.S. AIR FORCE: GLOBAL HAWK	16
FIGURE 5 BLACK WIDOW	17
FIGURE 6 MICRO AIR VEHICLE SCALE MODEL	17
FIGURE 7 MULTIPURPOSE SECURITY AND SURVEILLANCE MISSION PLATFO	DRM 18

#### UNMANNED AERIAL VECHICLES TECHNOLOGIES AND POTENTIAL NATIONAL GUARD MISSIONS

Our challenge in this new century is a difficult one—to prepare to defend our nation against the unknown, the uncertain, the unseen and the unexpected. That may seem, on the face of it, an impossible task. It is not. But to accomplish it, we must put aside comfortable ways of thinking and planning—take risks and try new things—so we can prepare our forces to deter and defeat adversaries that have not yet emerged to challenge us......For example, the experience in Afghanistan showed the effectiveness of unmanned aircraft—but it also revealed how few of them we have and what their weaknesses are. The Department has known for some time that it does not have enough manned reconnaissance and surveillance aircraft, command and control aircraft, air defense capabilities, chemical and biological defense units, as well as certain types of special operations forces. But in spite of the shortage of these and other scarce systems, the Department postponed the needed investments—while continuing to fund what were, in retrospect, less valuable programs. That needs to change. I

—Secretary of Defense Donald Rumsfeld

#### **PURPOSE**

The purpose of this research project is to examine the use of unmanned aerial vehicles for potential National Guard missions. National Guard missions are continually expanding in support of homeland security and defense without significant additions in manpower or operating funds. Operation NOBLE EAGLE (ONE) and Operation ENDURING FREEDOM have taxed National Guard resources. The National Guard responds to these new requirements while providing support for daily operations and regularly scheduled contingency operations. With these additional missions we need more innovative thinking to effectively stretch existing manpower, using a variety of resources to perform these missions. The use of unmanned aerial vehicles (UAVs), drones, and micro-unmanned aerial vehicles (MAVs) could provide the state-of-the-art technology needed to supplement limited resources available for specific missions and enhance the safety of our troops.

This research project will also briefly explore the potential use of the Air National Guard as a test bed site for experimental unmanned aerial vehicles, drones, and micro-unmanned aerial vehicles. The stability of the ANG work force provides a superb testing medium for new UAV programs. The types of missions for which UAVs could be used and their ability to provide timely intelligence, surveillance, and reconnaissance will be identified. New UAVs and drone surveillance vehicles have the potential to offer manpower savings and enhance force protection for soldiers and airmen as they perform their duties, both at home and abroad. This project concludes with specific proposals to

use micro UAVs in drug enforcement missions and medium-sized UAVs to assist in border patrol. If they perform in these missions well, micro-UAVs could play a role in urban warfare and small or medium sized UAVs could perform scout patrol duties during contingency operations for both the National Guard and the active components.

#### THE NATIONAL GUARD

The National Guard celebrated its 365th birthday this year in commemoration of its years of honorable service to the Nation. The National Guard has continued to evolve from the early days of being a militia guarding the colonies from the Indians, to weekend warriors, to virtually a full-time player. Today the National Guard serves side-by-side with its active duty counterparts, both stateside and abroad, as part of a fully integrated seamless military force fulfilling national security objectives and carrying out executive decisions. The manpower demands to expand security and homeland defense protecting America's interests, coupled with the already high operations tempo supporting peacekeeping and contingency operations throughout the world, have further stressed the already insufficient manning authorization in the National Guard.

Innovative thinking, effective budgeting, and the acquisition of new equipment such as unmanned aerial vehicles can help balance the workload. The National Guard is responsible for protecting life, property, and the public safety. They are called to duty by the Adjutant General, State Governor, or the President. When not federalized, traditional National Guardsmen perform their unit training assembly (UTA) for one weekend a month and train two weeks or more throughout the year. National Guard members respond to a myriad of state activities, including riot control, search and rescue, providing community support during natural disasters, and responding to crises. The National Guard's contributions to homeland security and homeland defense include a gamut of missions to protect the Nation. Some of these include the war on drugs, air patrol over the nation's skies, security defense from terrorist attacks on high-risk targets, and border patrol for national, territorial, and state borders. They also support daily operational missions, contingencies, and deployments. National Guard personnel take their responsibilities seriously and respond with pride, professionalism, enthusiasm, and a lean-forward attitude. The National Guard is a large military force of citizen soldiers and airman, ready to perform operational missions, numerous temporary duty assignments, state and federal duties to protect U.S. citizens abroad or in the continental United States, in addition to their primary mission of homeland security. Besides mission-related activities, they are also

committed to being active in community, state, and national programs to promote American values.<sup>2</sup>

The National Guard Bureau is both a staff and operating agency overseeing Army and Air National Guard functions. The National Guard Bureau staff works closely with the Army and Air staffs in designing and coordinating programs that directly impact the National Guard. They administer a myriad of training, operational support and maintenance programs for Army National Guard and Air National Guard personnel. The National Guard Bureau's staff acts as a communications conduit between the Army, Air Force and the assigned 54 states and territories.<sup>3</sup>

National Guard personnel are subject to being called to duty at any time to support their state or federal missions. Typically, National Guard personnel are among the first to respond, along with their civilian first-responders from the medical, fire, rescue, and police fields and the Federal Emergency Management Agency (FEMA). They are directed to duty by their governors to provide such emergency relief actions. These actions may include search and rescue efforts or response to state disasters caused by floods, wildfires, or tornadoes and to assist civil defense agencies as needed. Riot control, counter-drug operations, border patrol, and an assortment of other supported programs are incorporated into the lengthening list of the National Guard's operational and community support missions. Some of these community projects include road construction, medical service exercises which provide under-served populations with inoculations, physician contacts, dental care, and optometrist services. Innovative Readiness Training (IRT) projects benefit both the ARNG and the communities it serves by increasing National Guard training readiness and improving community facilities at the same time. "Under the IRT, the ARNG provided in excess of 205,000 soldier man-days to improve schools, parks and recreation facilities, and build and maintain roads." Many National Guardsmen wage the war on drugs under the direction of their state governor. National Guard soldiers and airmen have provided over 411,336 workdays supporting this endeavor since they picked up this mission. They play an important role in trying to battle the entry of drugs into the country and help eliminate the drug-rings from communities. Many units, under the direction of their governor, provide support to state and federal agencies such as the Drug Enforcement Agency (DEA).<sup>6</sup> In this capacity, teams are formed to confiscate drugs and clear out illegal tenants from known or suspected drug houses. Personnel performing these duties put themselves at risk to be injured or killed by the illegal drug traffickers or users.

National Guard military forces are challenged daily by the increased operational tempo. Many units have called their personnel to duty in response to events on 11 September 2001. Selective stop-loss of troops in critical career fields has been implemented to insure personnel are available for the increased workload and call to duty.

Currently, some 50,000 Army and Air National Guard troops are involved in homeland security and defense. Other Air National Guard personnel are flying aircraft out of Europe and Saudi Arabia supporting Bosnia and Kosovo operations or denying flight over Iraq along with the Army National Guard supporting missions with ground troops. Following 11 September 2001, the National Guard deployed several ground troops from the Army National Guard and Air National Guard aircrew and aviation support personnel to Afghanistan and the surrounding countries to fight the war on terrorism. The National Guard has many capabilities and therefore has their fingers in many operational pots.

#### AIR NATIONAL GUARD

The Air National Guard's Federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war. The Air National Guard provides assistance during national emergencies (such as natural disasters or civil disturbances). During peacetime, the combat-ready units and support units are assigned to most Air Force major commands to carry out missions compatible with training, mobilization readiness, and contingency operations. Current contingency operations include Operation JOINT (ENDEAVOR) GUARD in Bosnia, Operation PROVIDE COMFORT in Iraq and Turkey, Operation SOUTHERN WATCH in Kuwait, and Operation ALLIED FORCE in Kosovo. The Air National Guard provides almost half of the Air Force's tactical airlift support, combat communications functions, aero medical evacuations, and aerial refueling. Air National Guard units may be activated in a number of ways as prescribed by public law.<sup>7</sup>

The Air National Guard provided medical, weather, communications and senior staff officers for peace keeping operations along with aviation packages operating throughout Europe to support Operations JOINT GUARD, JOINT FORGE, and many more peacekeeping operations. The Air National Guard currently has their aircraft and personnel deployed overseas combating terrorism promoted by Osma bin Laden and his followers. Overall, the National Guard is playing a much bigger role than they have in the past due to the draw-downs in the active components following the end of the Cold War.

Air National Guard weather, civil engineers, medical, communications, logistics and operations personnel participate in many of the world-wide contingency operations on a voluntary basis. Air National Guard personnel rotate their personnel into a theater of operations every 15 months to support an Air Expeditionary Force (AEF) commitment window of 90 days of mission support. They very effectively blend their capabilities with other active and ANG units to form a formidable force in an operational arena. While many unit personnel are deployed for an AEF tasking, their unit simultaneously supports daily flying and ground operations at home and abroad.

Many critical war-fighting assets are in the Air National Guard and Air Force Reserve, making these reserve components key contributors to the total Air Force concept. The Air National Guard shoulders 100 percent of the continental United States' air interceptor force and are responsible for guarding our borders and coastlines. They also provide nearly 50 percent of the Tactical Airlift, 43 percent of the Air Refueling, 25 percent of the Rescue, and approximately 13 percent of the Bomber missions. The Air Force Reserve components contribute significantly to the war-fighting mission and as such, work closely with their active duty counterparts to insure a meshing of capabilities to maximize teamwork and assets.<sup>8</sup>

#### ARMY NATIONAL GUARD

The Army National Guard or Militia, as they were regularly called in earlier times, is the oldest of our military forces. The Militia was responsible for protecting the settlers in Jamestown in 1607, fought in the Pequot War of 1607, and has since served in every war or conflict the nation has fought. In 1940, augmented by the mobilized National Guard, the Regular Army increased in strength by 50 percent. During World War II they contributed 19 divisions, as well as numerous other units, to include Guard aviation squadrons. Over 138,000 Guardsmen participated in the Korean War and 63,000 in Desert Storm. Others mobilized for the Berlin Crisis, Vietnam, and numerous strikes and riots on the home front. Guardsmen have seen plenty of action while conducting peacekeeping operations in Somalia, Haiti, Bosnia, and Kosovo. In the recent past, the 49th Armored Division from the Texas Army National Guard supported Peacekeeping activities at Tuzla Air Base for up to nine months, with other Army Guard units following in their footsteps interspersed with rotations of active duty components.<sup>9</sup>

#### **NATIONAL GUARD RESOURCES**

During the week, the fulltime workforce of the Air National Guard's Active Guard Reserve (AGR) and Air Technicians support base flying and ground activities with a manpower pool of approximately 28 percent of their wing assigned billets. This mere 28 percent workforce insures that all traditional Guardsmen are trained and that administrative functions are fulfilled. They also provide the manpower needed to support daily operational commitments. This is especially noteworthy when you consider their active duty partners perform the same type of operational duties with a workforce of 90 percent plus. The ANG supports base and similar flying missions in an outstanding manner. They are able to do this because their technicians and Active Guard Reserves (AGR) personnel are highly trained and offer the continuity of a stable workforce. The active duty counterparts to the National Guard are more likely to rotate in and out of a base on an average of every two to four years depending on their career field. To achieve this high state of mission readiness and capabilities, the Air National Guard does an outstanding job in the training arena and consistently finds better ways and equipment to do the job within budgetary constraints. The Air National Guard has been very successful in garnering weapon system modernization support to keep them a viable component in the total force. They have highly trained, seasoned personnel to bring to the fight. They responded quickly and effectively to the terrorism committed on 11 September 2001. Examples of the Air National Guard's skill levels are evident by comparing active duty components' operational experience and maintenance savvy: "The Air National Guard pilots who launched to the skies over American cities on September 11th and deployed for overseas shortly thereafter, averaged over 2,000 hours flying the F-16 versus 100 hours for their young active duty counterparts. Ninety-seven percent of Air National Guard pilots have more than 500 hours experience in their jets compared to thirty-five percent of their active-duty counterparts." ANG air crews, aircraft maintenance and logistics personnel regularly train and compete in competitions such as Loadeo or Gunsmoke and walk away with trophies attesting to their superior expertise.

For the aviation deployment packages, the aircraft maintenance and logistics troops consistently take fewer people on deployments than their active duty counterparts due to the diversity of skill levels and solid cross-utilization training programs. In the past, Air National Guard personnel have excelled in their day-to-day ability to consistently repair logistical assets and keep them at a high readiness posture. However, as many of these highly skilled personnel retire or leave, it becomes more difficult to maintain the same level

of expertise and readiness. A staff member from OASD-RA observed that we have activated 15,699 guardsmen under a Partial Mobilization Authority to perform missions of security, intelligence, flight operations for combat air patrols (CAP), communications, air refueling operations, aero-medical, maintenance, civil engineering and logistics. Additionally the ANG is providing 6,938 volunteers in other active duty statuses to handle the missions listed above. With the increased workload of homeland support and security following 11 September 2001, we must find smarter ways of doing business in all career fields in the Air National Guard.<sup>11</sup>

The Army Guard's fulltime manning strength of military technicians and AGRs is funded at approximately 54percent, which provides them with a very limited workforce. This small percentage of personnel must juggle a multitude of responsibilities requiring increased funded resources. The fulltime force is responsible for organizing, training, administering, and recruiting personnel to fulfill Army National Guard missions. Many of the fulltime soldiers perform the majority of the day-to-day operations for the Army National Guard and regularly have to deploy to make up the shortfalls when traditional guardsmen are unable to leave their jobs without a mobilization order. The fulltime support authorizations are allocated by each state and territory to align with their daily workload and responsibilities to train members to be ready to deploy. The Army National Guard's operations tempo has been steadily increasing to support overseas contingencies and peacekeeping operations; the Army National Guard provides a majority of the fulltime force to support these missions. 12 "Despite force structure reductions, equipment modernization initiatives are generating increased technician requirements. Complex modern equipment generally requires more maintenance manpower than the equipment these systems replaced. Guard units can operate and maintain these systems at a cost savings to the Total Force, but they require more full-time soldiers". 13 Full-time forces of technicians and AGRs are key to maintaining mission readiness through training and overseeing the maintenance of unit equipment. The use of modern equipment is a force multiplier. Many of the fixed and rotary winged aircraft, tanks and communication systems are very old and require extensive maintenance time. This becomes more challenging each year as the equipment ages. As the National Guard transforms and strives to a maintain a high state of mission readiness, new equipment will be key to the readiness equation. Leading-edge equipment also attracts new recruits and helps retain current personnel. According to a staff member from OASD-RA, the Army National Guard, under the Partial Mobilization Authority, has mobilized 13,560 soldiers between 11 September

2001 and 19 February 2002, in support of Military Police, Infantry, Engineer, Ordinance, Transportation, Aviation, Special Forces, Chemical, Quartermaster, Medical, Military Intelligence, Training Support Divisions, Theater Material Management Center support, Signal, and Civil Affairs. The ARNG is providing 1,507 soldiers in a State Active Duty (SAD) status for force protection at armories, training sites, nuclear power facilities, key infrastructure sites, waterways and harbors. The ARNG is also using 2,312 volunteer soldiers in other active duty statuses to help support these missions. Currently, 1,795 soldiers are deployed to the CENTCOM Area of Responsibility (AOR) to include the MFO mission, 1,648 soldiers to EUCOM AOR, 437 soldiers to the SOUTHCOM AOR and 34 soldiers to the PACOM AOR. As the military continues to do more with less, the Army National Guard needs to work smarter, acquire new equipment for use and more effective train personnel to insure maximum utilization of limited resources.<sup>14</sup>

#### NATIONAL GUARD MISSION EXPANSION

Nearly 7,000 Army National Guardsmen, plus several thousand Air Guard personnel, despite their worries and concerns for family and friends in the aftermath of 9/11, were on duty in 26 states across the country on 12 September 2001, aiding and assisting their fellow Americans to cope with the horrible acts of terrorism against the United States. Air National Guard aircrews immediately carpeted the skies with fighter and tanker aircraft to protect our cities from further acts of terrorism. Both Army and Air National Guard units responded to the aircraft crash sites at the Twin Towers in New York, the Pentagon in Washington, DC, and in Pennsylvania to provide immediate medical, fire, security, engineering, and general support to aid the victims trapped, injured and dead among the rubble. National Guard personnel were dispatched by their governors to protect key infrastructure facilities and provide increased security at airports across the nation after flying operations resumed. Additional Guardsmen, to include some of our special operations troops, were activated to deploy in the operating areas of the Taliban and Al-Qaeda to support America's war against terrorism. Most recently, National Guard members supported homeland security missions as part of a joint task force for the 2002 Winter Olympics in Salt Lake City, Utah. As of 19 February 2002, the National Guard members supporting Operations for NOBLE EAGLE, ENDURING FREEDOM, FAA Airport Security and JOINT TASK FORCE OLYMPICS (JTF-O) reached 7,191 personnel on Title 32 status. 15 Lieutenant General Russell Davis, Chief of the National Guard Bureau,

pledged the National Guard's complete and unwavering support as President George Bush declared the terrorist attacks of September 11th "acts of war."

Following the horror and senseless death of thousands of Americans on 11 September 2001, President George W. Bush appointed Pennsylvania Governor Tom Ridge to head up a new cabinet position called the Office of Homeland Security (OHS) During many of the news broadcasts, President Bush was heard discussing the "critical need for central coordination and the failure of various departments and agencies of the United States government to collect and analyze information that could have led to the detection and arrests of terrorists before their attack on September 11th."

Balancing a myriad of information and closing the loop on a broad spectrum of information is paramount. Analyzing a bundle of related information is more productive than ferreting out potential terrorist hot spots from information gathered by several agencies independently looking at minor scraps of seemingly innocuous data. On their own, these small tidbits of information may seem unworthy of future investigation and are thus discounted. However, sharing these small bits of data through a network of agencies can facilitate identification of potential terrorist cell hotbeds. Interfacing and sharing data among agencies will hopefully produce the big picture for intelligence gathering in an effort to win the war on terrorism. The war against terrorism requires a proactive approach to defending the homeland citizens and Americans abroad. We can protect the primary rights of American citizens while still protecting them from an unpredictable enemy.<sup>17</sup> President Bush, recognizing the lack of coordination in intelligence collection and analysis in defense of our nation, established the Homeland Security Office to be responsible for these actions.

Tom Ridge has been charged by President Bush to oversee the efforts of the Homeland Security Office by "coordinating their efforts to gather intelligence to prevent an attack, to protect the borders and the critical systems inside the country and to respond immediately if terrorists strike again." In an article, Larry M. Wortzelk and Michael Scardaville have outlined their expectations of the Homeland Security Office's tasks. The National Guard may be prominently engaged in the following tasks from their list:: port security looking for weapons of mass destruction, border patrol security using Reserve Component assets to control illegal immigrants' entry to the U.S, the free exchange of information between law enforcement agencies such as federal law enforcers and military police, plus tightening and strengthening border security with the National Guard or military reserves. The President may also provide guidance to the Secretary of State to

work with Canada and Mexico to establish similar security measures. It would be beneficial to pair federal law enforcement personnel with trained military counterintelligence agents from the Department of Defense and tap their expertise in collection, analysis, counterintelligence, and investigations to help beef up FBI manpower shortages.<sup>19</sup>

#### NATIONAL GUARD RESOURCE ENHANCEMENTS

The National Guard's mission is continually transforming and must do so to stay viable and meet the Nation's needs. In view of the tragedy on 11 September 2001, the National Guard's mission, under the auspices of homeland security, is continually expanding without significant additions in manpower or operating funds. Doing more with stable or decreasing resources requires innovative thinking to effectively perform these expanded missions. The use of unmanned aerial vehicles (UAV) and drones could provide state-of-the-art technology to offset the manpower drain. The National Guard does not rotate its personnel regularly to different duty stations every few years, which provides for mission stability. Further, because it has a stable workforce to provide research data, the Air National Guard is an ideal organization for testing unmanned aerial vehicles and drone surveillance technology.

National Guard personnel are highly trained and support an unusually high operations tempo with minimal manning, especially on a full time basis. Better tools in their operational toolboxes are needed to make them more effective as they stretch the capabilities of their personnel to deploy for extended periods. It is getting more and more difficult to keep deploying in support of our Nation and still balance civilian jobs and family life. Using UAVs for border patrol could reduce the manpower needed to continually patrol the borders. The visibility of a patrolling UAV may also be considered a deterrent by the illegal aliens coming into our country. As our personnel combat acts of terrorism and are scattered to Central America, the Middle East, Europe, and Asia, we need new processes and state-of-the art equipment to make our jobs easier. Fully funded manpower authorizations and state-of-art equipment to include unmanned aerial vehicles and microunmanned aerial vehicles, can enhance National Guard capabilities.

#### TRANSFORMATION SUPPORT FROM TOP LEADERSHIP

On 13 February 2001, President Bush in a speech to Norfolk Naval Air Station personnel discussed the importance of increasing the military Research and Development

Budget by \$20 billion between 2002 and 2006. His plan was to allocate 20 percent of Research and Development (R&D) to especially promising programs.<sup>20</sup>

Since then, additional funds of 48 billion have been allocated for an increase in the overall defense program. The active duty and reserve components require a large portion of the funds to enable them to continually improve their mission capabilities through research and development, acquisition, and equipment fielding to support the nation's homeland defense strategy. The United States Air Force, Air Force Reserves and the Air National Guard are particularly interested in the execution of programs that include the use of unmanned aerial vehicles (UAVs), commonly used to gather intelligence during reconnaissance missions. These UAVs give the military real-time intelligence data, which is paramount for force protection in accordance with our National Security Strategy Plans and 2001 Quadrennial Defense Review.

"The President is committed to enlisting the power of American technology in the service of national security. In both R&D and acquisitions, he emphasized programs that offer our Armed Forces information superiority, safety through stealth, and victory achieved less through massed power and more through superior striking speed, agility, and mobility. In short, the President intends to equip the U.S. Armed Forces with the systems and strategy that will allow us to redefine war—on our terms. To that end, the President challenges the defense technology community to modernize the force beyond incremental improvements on defense systems already deployed and to develop technologies the military forces of the nation will need for the 21st Century."

Several companies have responded by developing and testing unmanned aerial vehicles that give the military additional capabilities. These UAVs can be used for most contingency operations and certainly for the war against terrorism to protect American citizens and guard the homeland.

#### **ACQUISITION NEEDS AND PROCESS**

The National Guard must look for smarter, more efficient processes to achieve our mission and the strategies discussed in the current Quadrennial Defense Review Report. Identifying our mission needs and supporting them with solid research and staffing to gain military support and political clout are the best mechanisms to garner timely state-of-theart equipment and/or mission changes. Consider the following discussion of some different types of UAVs and MAVs which have the potential to leverage the support the National Guard needs to accomplish its mission economically. Acquisition of a UAV type system has marketable potential and could prove highly successful within the National Guard.

#### **UNMANNED AERIAL VEHICLES**

UAVs are essentially unmanned, multi-sized, remote-controlled aerial vehicles flown from the ground by a pilot or ground operator. High-powered cameras are installed or attached to them. They can go into high threat areas to gather data without putting a pilot or aircrew at risk. These weapon systems provide the capability to locate, observe and analyze enemy targets and resources through information imagery captured by attached cameras. The information collected is relaved instantly to an aircraft control center staffed with personnel to analyze the images. The intelligence and reconnaissance information depicted from these video feed films can be immediately provided to an aircraft crew or to ground units to give them the needed reconnaissance information to enable them to use their forces to destroy or capture enemy assets. The Predator, one of the most common UAVs, is guided by aircrew operators with stick and rudder controls from an operations cell. This UAV has been frequently mentioned during the Balkans War and is now being successfully used extensively in Afghanistan, according to newscasters and key Air Force personnel.<sup>22</sup> The Predator UAV was developed by General Atomics in San Diego. California in 1994, tested for advanced concept technology demonstrations (ATCD) and deployed to Bosnia in 1996 for full operational use. Since then, the Predator has been continuously deployed overseas to Europe and Southwest Asia. During Kosovo operations, the Predator flew over 50 sorties in support of targeting operations. Some UAVs such as a Predator have the capability to deliver designated payloads for assigned missions such as a Hellfire missile. The Predator UAV was used very successfully in the Balkans by providing senior leaders with detailed imagery and reconnaissance information critical for timely intelligence gathering. The Predator is a long-dwell UAV operating in excess of 24 hours. It can fly approximately 400 nautical miles, hang out or loiter in the sky while performing surveillance for over 14 hours, and then fly back another 400 nautical miles. It operates usually around 15,000 feet, although it can fly in excess of 25,000 feet. It is approximately 26.6 feet long with a wing span of 48.5 feet and is valued at approximately \$3.2 million. The payload is about 450 pounds. It is flown manually. A pilot with a stick controls the aircraft from an operations cell set up somewhat like an aircraft simulator. The Predator can track targets four or five miles away with a video feed using electro-optical sensors, infrared video cameras, and a synthetic aperture radar. The realtime videos provide a clear picture of the target, terrain or desired equipment which is immediately transmitted via satellite to a command section for analysis and dissemination.

The Predator and other types of UAVs are informally known as commanders' spies in the sky.<sup>23</sup>

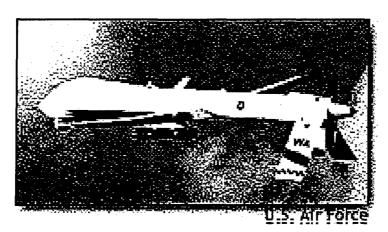


FIGURE 1 PREDATOR 24

General John Jumper, now the Chief of the Air Force, expressed his delight concerning the capabilities of the Predator.

"I think there's no doubt that UAVs have come of age. The Predator UAV we have deployed around the world has done superb work for us. We see UAVs like Global Hawk that have stayed airborne for long periods of time. I think these will eventually replace strategic manned reconnaissance aircraft. We will eventually have a conventional bomb-dropping capability also. This will come with time. Certainly nothing is technologically impossible, but we will see over time the utility of replacing all the aircraft. It's hard to replace the gray matter that is inherent in every human being. There's no computer that can do it quite that well yet."

UAVs can be flown by an operator in a simulator-type cockpit or by aiming the remote and allowing automatic flight profile adjustments to be made. Larger UAVs such as the Global Hawk and the Shadow are basically built like an aircraft with cameras attached to enable them to capture real-time intelligence data in an operational environment. This reconnaissance data is then relayed via satellite to a control center for action. The information provided can reflect terrain or equipment situational awareness or contribute to current intelligence pertaining to an adversaries' actions. Most UAVs consist of three components: an air vehicle, a ground station, and a communications structure. Each system can be assigned multiple air vehicles to provide for back-to-back launches. This enables one system to land and be regenerated for flight by maintenance personnel while another UAV uses the system's data link for flight controls and imagery transfer. The larger UAVs are expensive and cost nearly 3.2 million, nearly equivalent to a manned aircraft. These systems are not thought to be expendable, yet it is better to lose them than

an aircraft with a flight crew on board. UAVs are well-suited for very long dull missions that are physically stressing. They are also the perfect assets to handle missions which are unsafe for humans because of chemical and biological agent threats (what is often called a dirty mission). The UAVs are the perfect weapon system to use for dangerous missions in a high threat area with a potential to be shot down which jeopardizes the safety of the air crew.<sup>26</sup>

The Army's Shadow UAV is very versatile, agile and logistically sound. Three C-130s can carry it and the maintenance crew can complete the set up within four hours on station. The Shadow has the ability to launch and recover in an area the size of a soccer field. The newest tactical version of this system has an improved target acquisition and surveillance system to view the battle field. This model is undergoing operational testing at Fort Huachuca and Fort Hood. The Shadow is approximately 11.2 feet long with a wingspan of 12.7 feet and goes to an altitude of approximately 15,000 feet with a 5 hour sortie duration capability. Its payload capacity is 60 pounds and has a maximum gross weight of 328 pounds.<sup>27</sup>

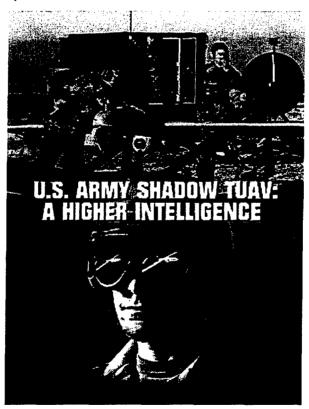


FIGURE 2 SHADOW TACTICAL UNMANNED AERIAL VEHICLE<sup>28</sup>

The Hunter UAV is known as the Army's workhorse. It is twice the size of the Shadow UAV. It is remotely piloted by enlisted soldiers. The Hunter provides military

commanders with nighttime or daylight capabilities for reconnaissance, intelligence, surveillance and target acquisition missions. With its longer range (in excess of 250 kilometers) and its sortie duration capability of up to 12-hours, it can carry heavier payloads.<sup>29</sup> It can fly for approximately 108 nautical miles and operate from unimproved air strips in support of task force commanders.<sup>30</sup> It has a ticket price of approximately 30 million dollars. The wingspan of the Hunter is 20 feet and its length is 23 feet. It has been used in Kosovo extensively to support NATO combat and peacekeeping operations. During the air campaign for "Operation ALLIED FORCE, Task Force Hunter flew over 1,500 hours supporting JOINT TASK FORCE NOBLE ANVIL and TASK FORCE HAWK in airspace controlled by the Combined Air Operations Center based at Vincenza, Italy"<sup>31</sup> New initiatives and tests are on-going in which Apache helicopters actually control both the airframe and its sensor in flight. The effectiveness and the efficiency of the Apache crew are enhanced and their survivability increased by the UAV reconnaissance data.

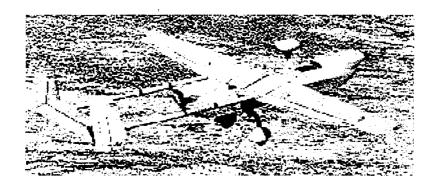


FIGURE 3 HUNTER UAV 32

The Global Hawk is a high-altitude, long-range, UAV with the capability to travel up to 14,000 nautical miles and stay airborne for approximately 42-hours. It has cameras, infrared sensors, radar, jamming equipment and other countermeasures. This 44 foot long automatic spy plane has a wing span of approximately 116 feet, can reach altitudes of 67,000 feet at speeds up to 397 miles per hour. It is still being tested with a tentative price variable ranging from 20-45 million dollars.<sup>33</sup>

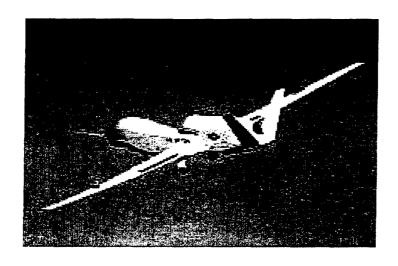


FIGURE 4 U.S. AIR FORCE: GLOBAL HAWK 34

The Black Widow is a small palm size 6-inch flying machine able to gather military intelligence. It is currently being funded and researched by the Defense Advanced Research Projects Agency (DARPA). The Black Widow is estimated to weigh 1.75 ounces, have a speed of 43 miles per hour, a range of .6 miles at an altitude of 769 feet, and an endurance of 30-minutes.<sup>35</sup> This micro-UAV can offer reconnaissance for a variety of missions. It can also be used for reconnaissance and surveillance by small units to provide intelligence capabilities in urban environments for possibly tagging targets or detecting chemical or biological agents. There are many other ideas about what these micro UAVs could be used for, especially in confined spaces or even inside buildings or other structures. Many of these new technologies are still being explored and tested by DARPA. One especially desirable attribute would be the capability to land on a ledge and collect information somewhat like a ground sensor. There are plans to put 100 of these in soldiers hands for testing and evaluation in FY 2003.<sup>36</sup>

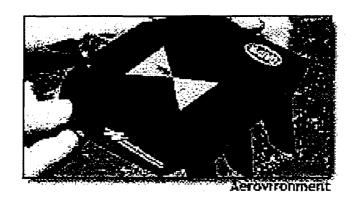


FIGURE 5 BLACK WIDOW<sup>37</sup>

DARPA is also supporting another Micro-air vehicle (MAV) with the potential to carry a tiny payload, simple avionics and a mechanism to support a communication link.<sup>38</sup>



FIGURE 6 MICRO AIR VEHICLE SCALE MODEL<sup>39</sup>

The Multipurpose Security and Surveillance Mission Platform (MSSMP) was created to allow for a rapid force deployable extended-range surveillance capability. It is useful for a myriad of operational missions like fire control, force protection, tactical security, support to counter drug, and border patrol operations. It can also be used as an assessment mechanism to search areas for contamination from chemicals. The MSSMP system was

designed for high mobility in mind and remote operations with tactical radio links. Desired qualities were long flight endurance and the ability to control three remotes from one base station.<sup>40</sup>

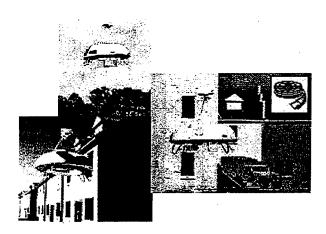


Figure 7 MULTIPURPOSE SECURITY AND SURVEILLANCE MISSION PLATFORM<sup>41</sup>

#### UNMANNED AERIAL VEHICLE CAPABILITIES

UAVs bring the US military services to the leading edge of a fight. They provide us with critical real-time intelligence through surveillance and reconnaissance. This intelligence enables our airmen and soldiers to successfully engage adversaries in combat and pursue terrorist and war criminals attacking US interests. High demand low velocity assets such as UAVs can enhance intelligence, surveillance, and reconnaissance (ISR) operations across the full spectrum of operations. However, there just are not enough to go around at the moment. President Bush supports military access to UAV technology. He and other senior leaders have demonstrated their belief in concern to the importance of UAV technology. Funds are being reallocated to develop and build UAVs to satisfy a variety of changing missions<sup>42</sup>

#### UAV CURRENT USES IN THE NATIONAL GUARD

Unmanned aerial vehicles have provided force protection for Guardsmen in the field by providing reconnaissance for targets or enemies or by scouting the terrain ahead. Several superb intelligence-gathering instruments, like the Predator and the Global Hawk unmanned aerial vehicles are available. In future roles the larger weapon systems have extraordinary capabilities that will enable us to gather reconnaissance information without endangering a pilot. They were successfully and extensively used in the Balkans for

targeting information from the surveillance data collected. Most recently, they have been used in Afghanistan and have even released Hell-fire missiles.

#### NEW UAV ROLES IN THE NATIONAL GUARD

There are a number of small micro-type bug-size reconnaissance vehicles presently under development. Bug sized micro-type models and 6-inch mini aerial vehicles are currently being tested. The 6-inch remote controlled UAVs have an approximate 30-minute loiter time. They have mounted camera apertures to collect imagery that has unlimited potential, especially in urban areas. Palm-sized ground-piloted unmanned vehicles, once perfected, will have enhanced capabilities to perform scout duties over terrain. They can provide immediate feedback to ground troops traversing the area and can give the extra visibility to the ground troops concerning potential adversaries over the next rise. The intelligence garnered can enhance and provide for safer patrol operations of ground troops. These systems also can yield significant man-hour saving and improved force protection for the National Guard supporting civil-military operations.

The Air National Guard could conduct testing programs for micro-UAVs such as the Black Widow or other mini-UAVs for DEA missions or urban warfare. During stateside drug interdiction and crack down missions on drug houses, the 6-inch or smaller micro UAVs could provide sensitive security and force protection information for National Guard troops supporting civil authority. Small UAVs like the micro-UAVs are the key to enhanced force protection, patrolling borders, and protecting key assets as our mission in homeland defense expands. These UAVs have the capacity to provide eyes on target quicker than a random patrol could. The benefits of gaining the reconnaissance of a drug house prior to entry are untold when it comes to force protection Prior to building entry it would enhance force protection of Guard and law enforcement personnel to know the situation they are walking into to. A micro UAV would be the ideal tool to give this team the added benefit of reconnaissance of the situation that is needed to reduce team injury or death. Just imagine being able to float a micro UAV up to a window to scope out the current situation. The information relayed in real time would enable the team to know if the personnel inside are armed and also the layout of the house, for fast capture of dealer and users. Having this information provides some of the needed force protection required for personnel safety.

Selected National Guard units patrol their state borders and conduct other assigned missions dealing with our borders. Some of the medium-sized UAVs (Multipurpose

Security and Surveillance Mission Platforms, shaped like a donut and weighing approximately 200 pounds) could be used to fulfill these missions until the smaller UAVs or micro-UAVs are in production. Guard units authorized UAVs like the Shadow or a Multipurpose Security and Surveillance Mission Platform could also patrol key infrastructures like nuclear plants, federal buildings, or key facilities. A control center with response teams could be aligned to have the capacity to quickly dispatch personnel to help catch the illegal aliens trying to get into our country in an unauthorized fashion or prevent unauthorized access or close proximity to sensitive infrastructure facilities.

Some of the larger UAVs that can collect data for extended periods of time might be ideal to perform sweeps of critical areas, enabling response teams to control our Nation's borders or key infrastructures such as dams, nuclear plants, or key military facilities. This technology could save vast numbers of man-hours, eliminating the need to dispatch personnel to drive or walk the perimeters of these areas of responsibility. Response teams could be available to handle identified trouble areas and dispatched regionally by each state as applicable to their responsibilities.

#### CONCLUSION

The war against terrorism requires a good offense and an effective defense of the American homeland. Established bureaucratic order must be transcended by the new Office of Homeland Security so that glaring security gaps can be filled quickly. A comprehensive strategy for homeland defense must be devised while keeping civil liberties intact. With the expanded missions involved in homeland security, the National Guard is a logical choice to be assigned UAVs and to be designated a UAV operational testing center.

As our nation has gone forward to fight the war on terror, we have been able to minimize the casualty of our soldiers, airman, sailors and marines by using new technologies. UAVs have been a big part of our strategy for timely, precise reconnaissance. The use of UAVs, which is continually expanding with new technological initiatives, should be exploited. The intelligence, surveillance and reconnaissance (ISR) data captured from UAVs can enhance our war-fighting capabilities. Use of UAVs will enhance target acquisition, real time battle field command observation, combat aircraft, target drones, logistical supply and combat re-supply, organic ground combat support, battle damage assessment, search and rescue, fire fighting, non-lethal weapons (high-

powered microwave), chemical and biological warfare, chemical, biological and nuclear remote sensing, monitoring and early warning and rapid smoke camouflage disbursement.

The National Guard's mission is continually transforming to ensure it stays a viable asset to our Nation's defense. The National Guard streamlines operational processes, identifies key issues through a variety of senior leaders councils, and maintains good relations with those politically responsible for new missions, facilities, equipment and modernization of assets through acquisition programs. Through persuasive National Guard commanders and Adjutant Generals, state governors, senators, and congressmen providing political support, the Guard receives favorable allocation of funds for new facilities, weapon system changes and modernization of equipment and aircraft.

The National Guard can provide a stable workforce, one that does not change duty assignments every three years like their active duty counterparts. Since personnel in the National Guard usually serve in one or two units throughout their entire career, they have continuity and stability in their workforce. The full time work force that is needed to follow the progress of a developing weapon system from cradle to grave with continuity and continuous technical expertise is present in the National Guard. Continuity of personnel encourages technical expertise, a definite plus when testing or evaluating new systems. Even now, when UAV such as the Predator make modifications, a group of civilian contractors manage the systems update to provide for stability.

The National Guard uses innovative thinking to effectively provide required manpower support to perform their missions. The use of unmanned aerial vehicles, drones, and micro- air vehicles could provide the state-of-the-art technology needed to offset any inadequate manpower caused by expanded missions. With the proper manning, supply, training and facility resources, the Guard seems to be a logical resource to be used for new UAV/drone surveillance science technological testing.

The National Guard is the logical choice to be a testing and research hub for UAV and drones. The National Guard regularly leads the pack on having aircraft modifications approved for better ways of doing business. The National Guard has been a leader in innovative technologies on aircraft and has higher mission capable rates than most units, probably stemming from personnel's longevity of service and the expertise to be garnered in one place. The skills in place for those activities will easily transfer to testing effective uses of UAVs and drones.

With the expansion of National Guard responsibilities under the auspices of Homeland Security and with the need for the economical use of manpower, the use of

UAVs and micro-UAVs should be assigned to the National Guard for its missions of homeland security. As technologies continue to develop, and the National Guard actively identifies, plans, programs, and budges for acquisition of new resources to enhance their operational effectiveness, the National Guard should be directed to include UAVs in their acquisition planning.

Without doubt, UAVs employed by the National Guard would serve our national interests. Clearly the National Guard is the right military component to use and operationally test unmanned aerial vehicles to enhance mission success and save manpower.

WORD COUNT = 7574

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